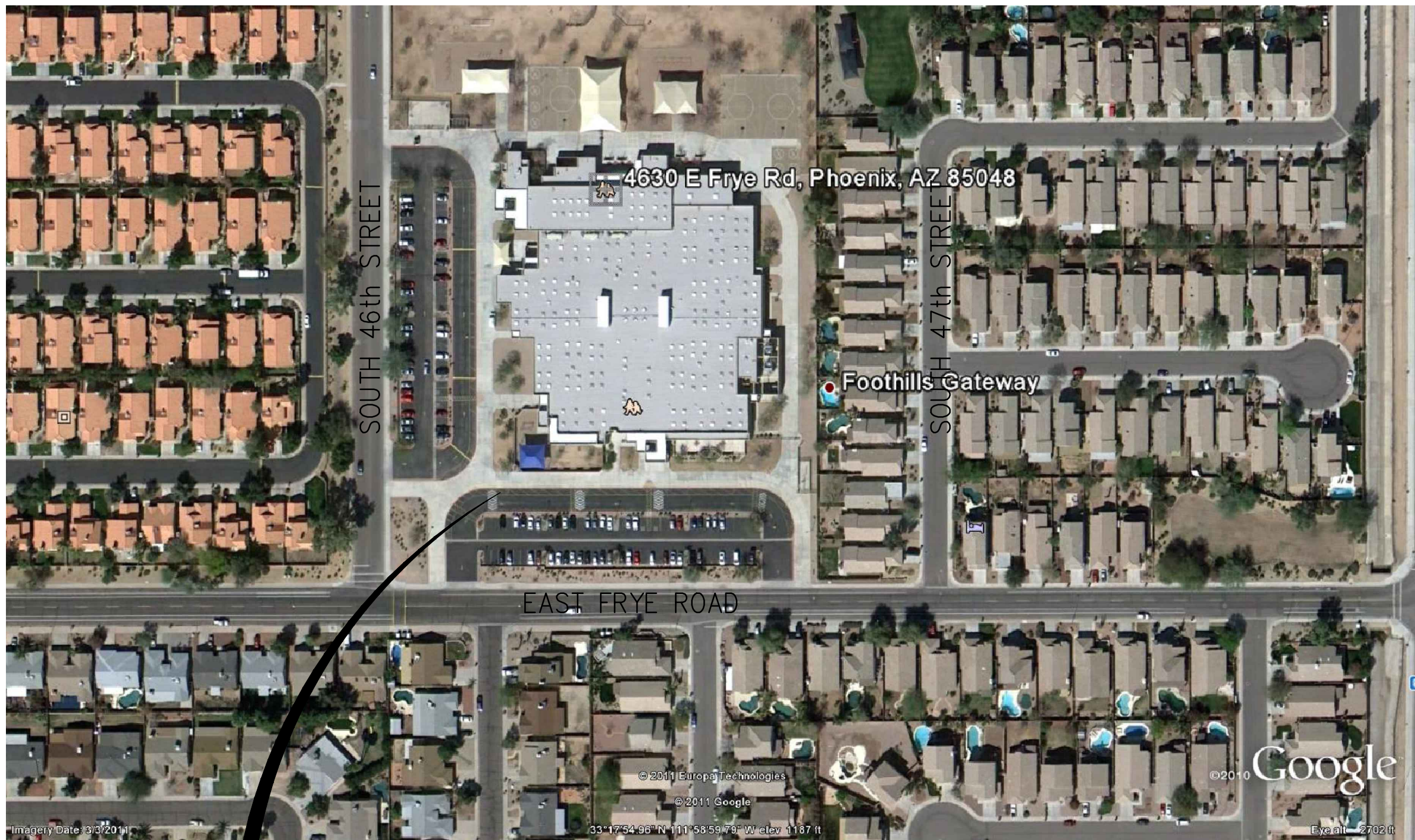


KYRENE SCHOOL DISTRICT
COOLING TOWER REPLACEMENT
FOR
KYRENE
del MILENIO ELEMENTARY SCHOOL



KYRENE del MILENIO ELEMENTARY SCHOOL
4630 S. FRYE ROAD
PHOENIX, ARIZONA 85048

MECHANICAL AND ELECTRICAL ENGINEERS:



LSW ENGINEERS ARIZONA, INCORPORATED
2333 WEST NORTHERN AVENUE
PHOENIX, ARIZONA 85021
(602) 249-1320

STRUCTURAL ENGINEERS:

GERVASIO AND ASSOCIATES, INC.
77 E. THOMAS ROAD, STE 120
PHOENIX, ARIZONA 850152
(602) 285-1720

CODE DATA

CITY OF PHOENIX CODES

2006 PHOENIX BUILDING CODE
2006 PHOENIX RESIDENTIAL CODE
2006 PHOENIX EXISTING BUILDING CODE
2006 PHOENIX ENERGY CONSERVATION CODE
2006 PHOENIX MECHANICAL CODE
2006 PHOENIX FUEL GAS CODE
2006 PHOENIX FIRE CODE
2006 PHOENIX PERFORMANCE CODE
2008 NATIONAL ELECTRICAL CODE/NFPA-70 WITH PHOENIX AMENDMENTS
2006 UNIFORM PLUMBING CODE WITH PHOENIX AMENDMENTS (148KB), 1 TABLE 11-1
2007 ASME A17.1 SAFETY CODE FOR ELEVATORS AND ESCALATORS WITH PHOENIX AMENDMENTS
2007 ASME A17.7 PERFORMANCE-BASED SAFETY CODE FOR ELEVATORS AND ESCALATORS
2002 ASME A17.3 SAFETY CODE FOR EXISTING ELEVATORS AND ESCALATORS WITH PHOENIX AMENDMENTS
2008 ASME A18.1 SAFETY CODE FOR PLATFORM LIFTS AND STAIRWAY CHAIRLIFTS

SHEET INDEX

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M-2	NEW FLOOR PLAN AND DIAGRAM
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E-2	ELECTRICAL SITE PLAN
E-3	ELECTRICAL DEMOLITION FLOOR PLAN
E-4	NEW ELECTRICAL FLOOR PLAN
E-5	ONE LINE DIAGRAM
S-1	PARTIAL FOUNDATION PLAN

SCOPE OF WORK

BASE BID

- Remove and replace the existing cooling towers, tower supports, floor sink, etc.
- Install new galvanized cooling towers, structural tower supports, floor sink, etc. Reconfigure and reconnect the existing condenser water piping to the new towers (provide new BFV's at the towers), provide new tower drains and overflows, reconnect the existing water make-up, electrical and controls.

ALTERNATE #1 BID

- Also remove and replace the pumps, piping, water treatment, floor sink, etc.
- Install new fiberglass cooling towers, pumps, piping, valves, VFD's, water treatment, heat exchanger, tower filters, new tower water make-up, floor sink, electrical, controls, etc.
- All work indicated on these mechanical and electrical drawings.

REV.	DATE	DESCRIPTION	BY

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E-Mail: lswphx@lswphx.com

COVER SHEET

KYRENE del MILENIO
ELEMENTARY SCHOOL

4630 E. FRYE ROAD
PHOENIX, ARIZONA 85048

DR. BY
LRW

DES. BY
LAM

CHK. BY
LAM/RAB

DATE
02/17/12

JOB NO.
2011-097.000

SHEET NO.
CS
OF

ELECTRICAL SYMBOLS LIST







- WEATHERPROOF

ONE LINE SYMBOLS

- AUTOMATIC TRANSFER SWITCH—AMPERAGE AND NUMBER OF POLES INDICATED**

ELECTRICAL SYMBOLS LIST

SYMBOLS SHOWN HERE MAY NOT ALL BE REFLECTED ON PLANS

- | | |
|---|---|
|  | SERVICE ENTRANCE OR DISTRIBUTION SECTION |
|  | PUSHBUTTON |
|  | CONTACTOR |
|  | TIME SWITCH |
|  | TELEVISION ANTENNA SYSTEM OUTLET |
|  | THERMOSTAT |
| AFI | ABOVE FINISHED FLOOR (TO CENTER LINE OF ITEM) |
| AFG | ABOVE FINISH GRADE (TO CENTER LINE OF ITEM) |
| ATS | AUTOMATIC TRANSFER SWITCH |
| CO | CONDUIT ONLY |
| DS | DISTRIBUTION SECTION |
| EC | EMERGENCY CONDUIT |
| EDF | ELECTRIC DRINKING FOUNTAIN |
| EF | EXHAUST FAN |

NOTE:

ALL CONVENIENCE OUTLETS AND LIGHTING SWITCHES SHALL BE MOUNTED AT A HEIGHT TO MEET OR EXCEED THE AMERICANS WITH DISABILITIES ACT REQUIREMENTS. UNLESS NOTED OTHERWISE, THESE SHALL BE:

RECEPTACLES - 15" (TO BOTTOM OF DEVICE) A.F.F.
- 48" (TO TOP OF DEVICE) A.F.F.
SWITCHES

Φ SINGLE CONVENIENCE RECEPTACLE

~~Ø~~ DUPLEX RECEPTACLE-SLASH INDICATES OUTLET MOUNTED ABOVE COUNTER (THIS APPLIES TO ALL TYPES OF OUTLETS) (CONFIRM HEIGHT AND LOCATION)

DUPLEX RECEPTACLE WITH GROUND

 QUADRAPLEX RECEPTACLE OUTLET

DUPLEX RECEPTACLE SPLIT WIRED

QUADRAPLEX RECEPTACLE ISOLATED GROUND TYPE

RECEPTACLE ON EMERGENCY POWER

SINGLE POLE SWITCH

THREE WAY SWITCH

S₄ FOUR WAY SWITCH

OUTLET OR SWITCH CONTROL INDICATION

TELEPHONE MOUNTING BOARD, 3/4" PLYWOOD W/
OUTSIDE ELECTRICAL TAPS AND 4" HOLES

CONDUIT CONCEALED IN CEILING OR WALL CONSTRUCTION

CONDUIT CONCEALED IN OR UNDER FLOOR CONSTRUCTION

CONDUIT W/O INDICATION SHALL BE TWO CONDUCTORS #12
AWG MIN IN 3/4" CONDUIT CIRCUIT PANEL & CONDUIT

(GROUND WIRES ARE NOT SHOWN, BUT SHALL BE INSTALLED IN CONDUIT)

CONDUIT STUB-OUT, BUSH CAP AND PERMANENTLY MARK LOCATION

EXISTING DEVICES ARE INDICATED AS DASHED

EXISTING CONDUIT TO REMAIN. PROVIDE NEW

2 MOTOR SIZE AND RATING INDICATED

☒ MOTOR CONTROLLER SIZE AS INDICATED

 MOTOR CONTROLLER FURNISHED WITH EQUIPMENT

RS-R	 USED DISCONNECT SWITCH, IN SUBCIRCUIT INDICATES NON-FUSED
 USED DISCONNECT SWITCH, IN SUBCIRCUIT INDICATES FUSED	 USED DISCONNECT SWITCH, IN SUBCIRCUIT INDICATES FUSED

COMBINATION MOTOR CONTROLLER & DISCONNECT SWITCH

MANUAL MOTOR STARTER W/ THERMAL OVERLOAD PROTECTION

S_{HP}
HORSE POWER RATED FAN SWITCH

TRANSFORMER

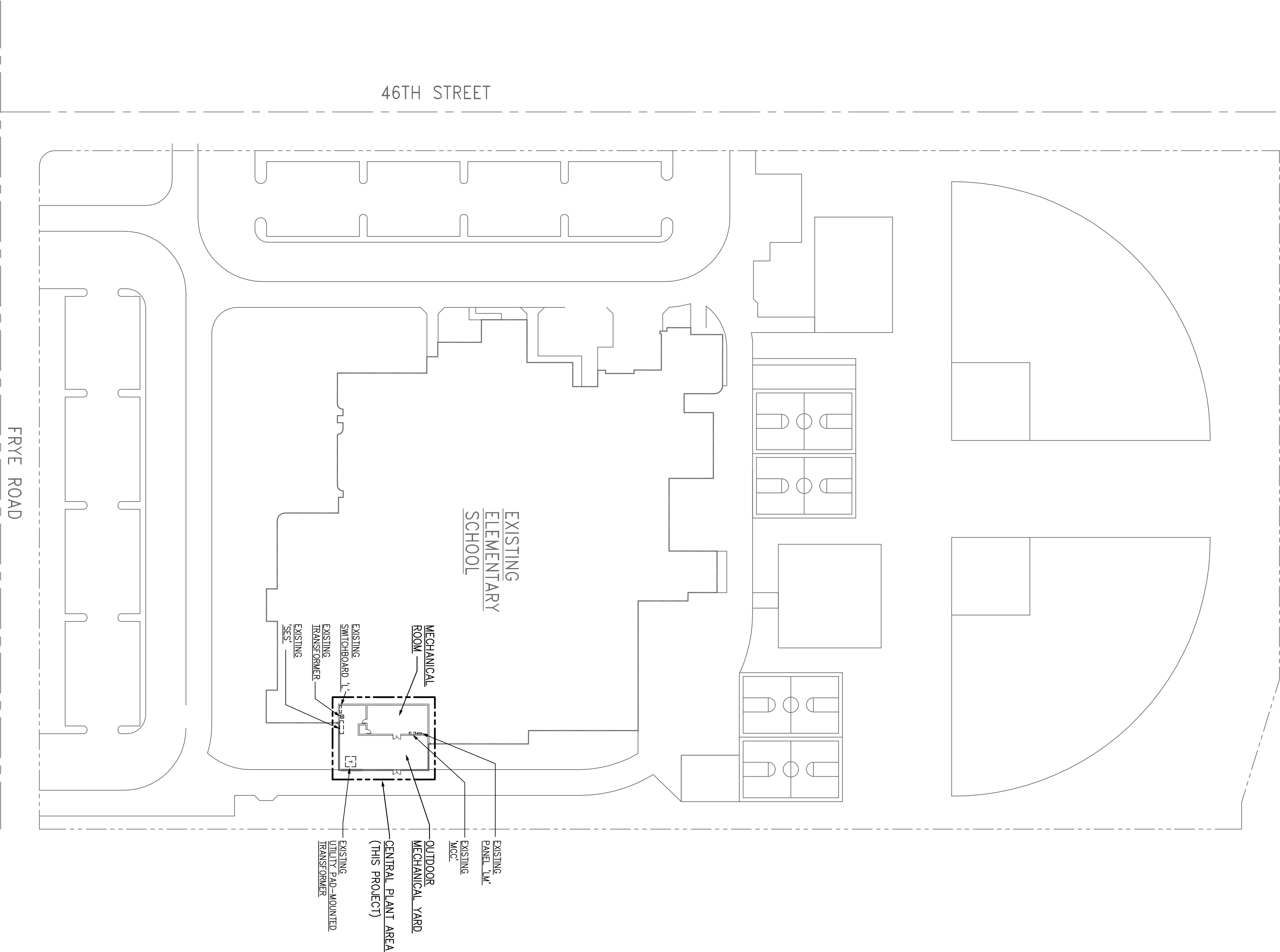
1. **INTRODUCTION**

**KYRENE del MILENIO
ELEMENTARY SCHOOL**

**4630 E. FRYE ROAD
PHOENIX, ARIZONA 85048**

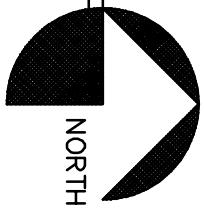


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ELECTRICAL SITE PLAN

SCALE: 1" = 50'-0"



ELECTRICAL SITE PLAN

KYRENE del MILENIO
ELEMENTARY SCHOOL

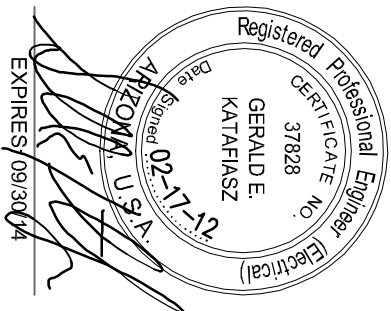
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DR. BY	DES. BY	DWG. BY
DL	JGE	GEK

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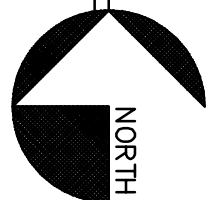
E-2

- OF -

1. EXISTING CONTROL PANEL TO REMAIN.
2. EXISTING CHILLER CONTROL PANEL TO REMAIN.
3. EXISTING TOWER FILTRATION SYSTEM TO BE REMOVED



SCALE: 1/4" = 1'-0"

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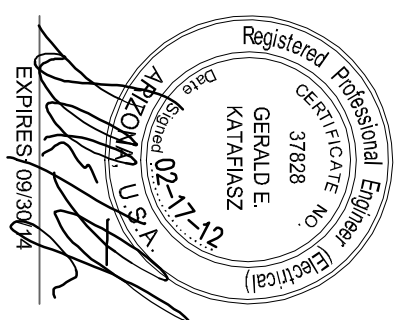
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ELECTRICAL DEMOLITION FLOOR PLAN

**KYRENE del MILENIO
ELEMENTARY SCHOOL**

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PHOENIX, ARIZONA 85048



DR. BY DJ	DES. BY JGE	CKD. BY GEK
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02/17/12	2011-097.000

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KEYED NOTES (#)

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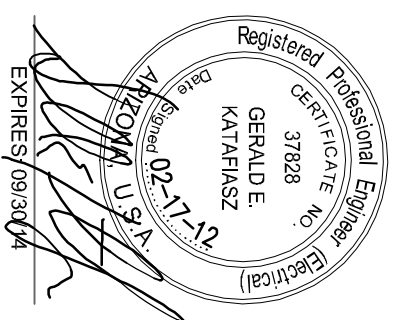
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NEW ELECTRICAL FLOOR PLAN

**KYRENE del MILENIO
ELEMENTARY SCHOOL**

4630 E. FRYE ROAD
PHOENIX, ARIZONA 85048



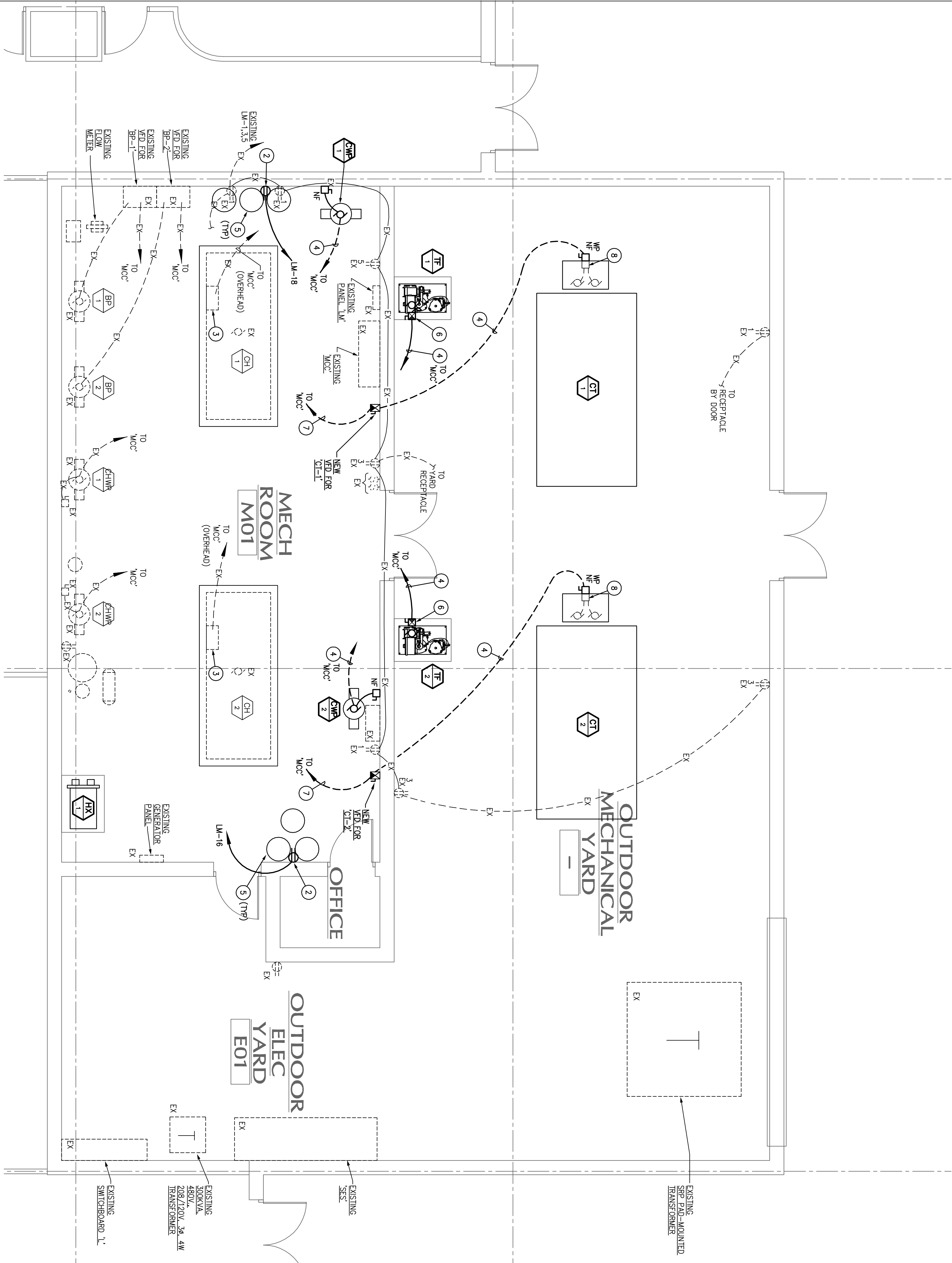
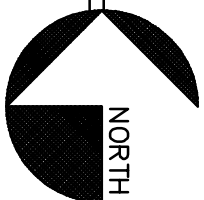
DR. BY DJ	DES. BY JGE	CKD. BY GEK
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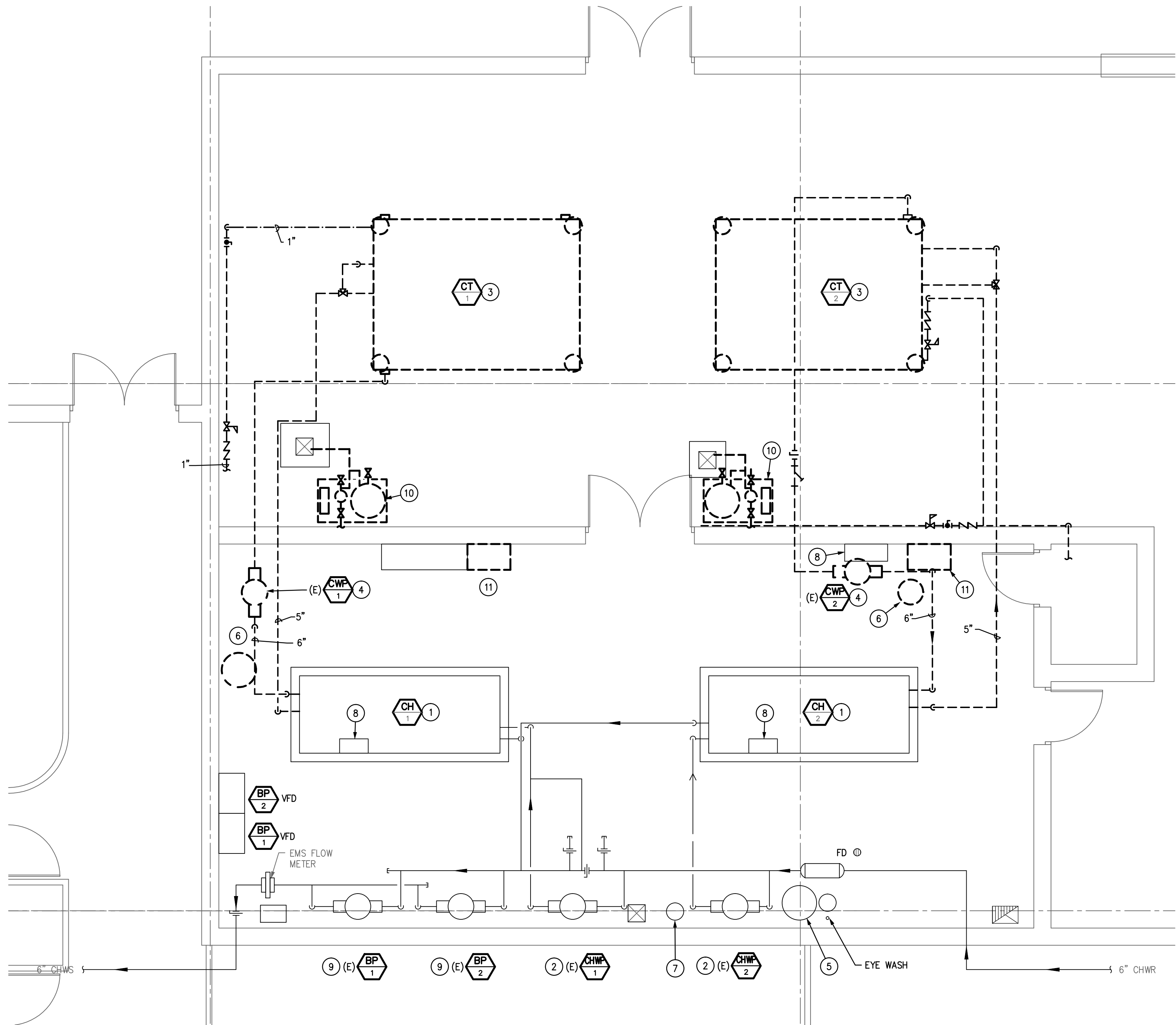
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NEW ELECTRICAL FLOOR PLAN

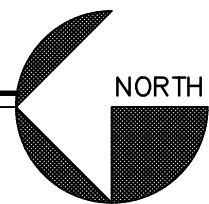
SCALE: 1/4" = 1'-0"

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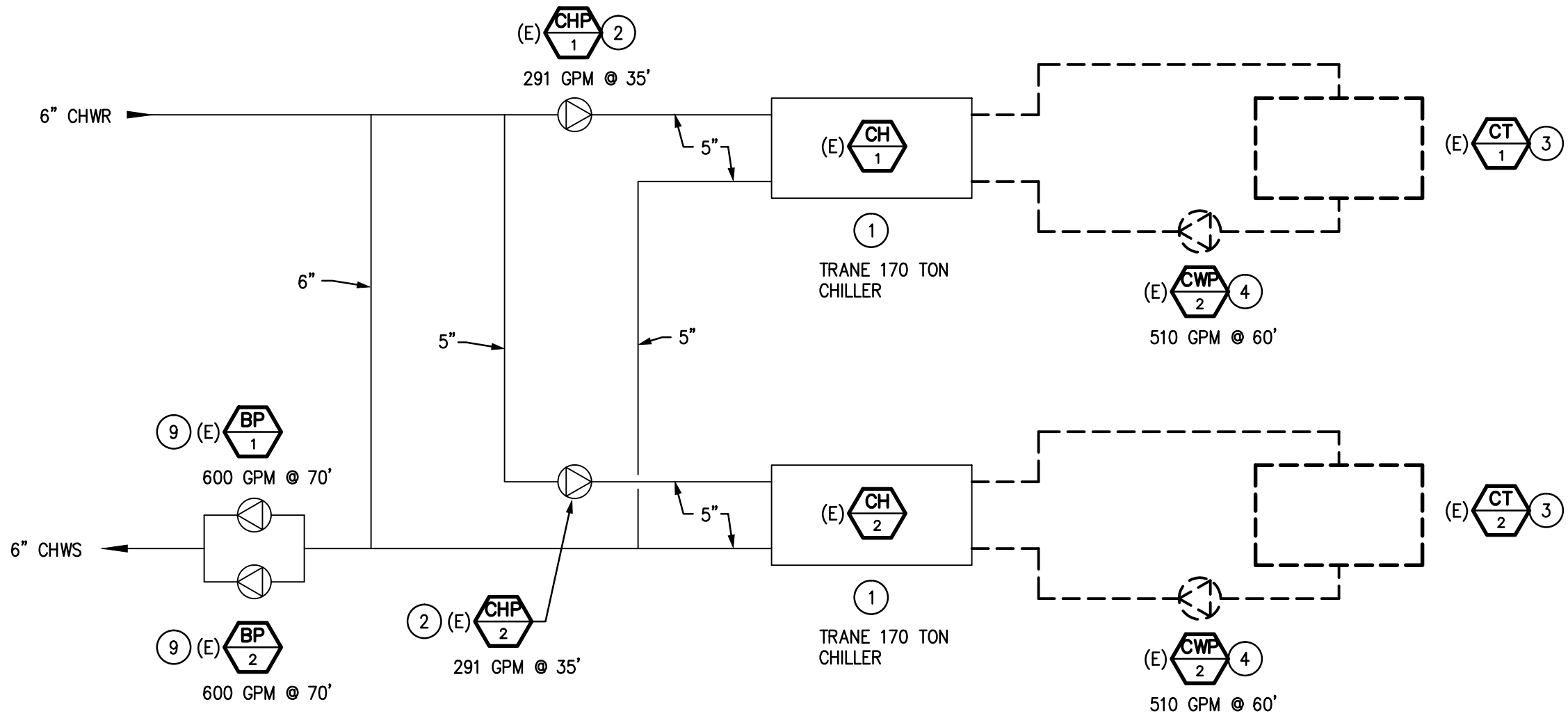
DEMOLITION FLOOR PLAN

SCALE: 1/4" = 1'-0"



KEYED NOTES (#)

1. EXISTING CHILLER TO REMAIN.
2. EXISTING CHILLED WATER PUMP TO REMAIN.
3. REMOVE EXISTING COOLING TOWER AND ASSOCIATED PIPING FOR INSTALLATION OF NEW TOWER.
4. REMOVE EXISTING TOWER CONDENSER PUMP.
5. EXISTING EXPANSION TANK TO REMAIN.
6. REMOVE EXISTING CHEMICAL TREATMENT STATION.
7. EXISTING POT FEEDER TO REMAIN.
8. EXISTING CONTROL PANEL TO REMAIN.
9. EXISTING BUILDING CHILLED WATER PUMP TO REMAIN.
10. REMOVE EXISTING TOWER FILTRATION SYSTEM AND ALL ASSOCIATED PIPING FOR NEW UNIT.
11. REMOVE EXISTING COOLING TOWER VFD.



CENTRAL PLANT DEMOLITION SCHEMATIC DIAGRAM

NTS

REV.	DATE	DESCRIPTION	BY

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DEMOLITION FLOOR PLAN

KYRENE del MILENIO
ELEMENTARY SCHOOL

4630 E. FRYE ROAD
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Professional Engineer
Certificate No. 31249
RUSSELL A. BETZ
02-06-13
ARIZONA, U.S.A.
EXPIRES: 03/31/15

DR. BY
TS

DES. BY
LAM

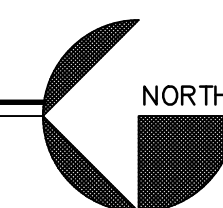
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OF



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PLATE AND FRAME HEAT EXCHANGER SCHEDULE													
MARK	AREA SERVED	MANUFACTURER	MODEL	MBH	COLD SIDE				HOT SIDE				REMARKS
					GPM	MAX ΔP (FT)	ENT WTR TEMP (°F)	LVG WTR TEMP (°F)	GPM	MAX ΔP (FT)	ENT WTR TEMP (°F)	LVG WTR TEMP (°F)	
HX-1	CH-2 / CT-2	MUELLER	AT40MV	1164	510	11.6	50.0	54.6	291	4.2	61.0	53.0	4" CONN., 100 PLATES

PUMP SCHEDULE													
MARK	AREA SERVED	MANUFACTURER	MODEL	TYPE	GPM	HEAD (FT) H2O	MIN EFF %	MAX NPSHR (FT)	MOTOR				REMARKS
									HP	BHP	RPM	V/PH	
CWP-1	CT-1	TACO	6009	KS	510	60	76	8	15	10.2	1750	480/3	①②
CWP-2	CT-2	TACO	6009	KS	510	60	76	8	15	10.2	1750	480/3	①②






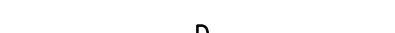

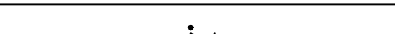
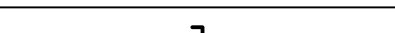
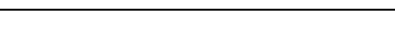
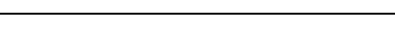
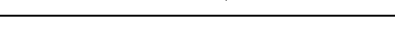
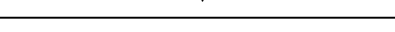

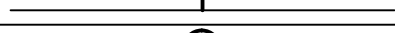
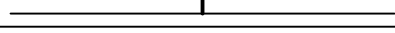
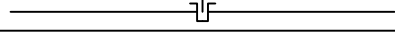


- NOTES:
- ① PROVIDE WITH NON OVERLOADING MOTOR.
- ② PROVIDE WITH PREMIUM EFFICIENCY MOTOR (5 HP OR ABOVE).

COOLING TOWER SCHEDULE											
MARK	AREA SERVED	MANUFACTURER	MODEL	WATER			FAN SECTION			OPER WEIGHT LBS	REMARKS
				GPM	INLET °F	OUTLET °F	WB °F	HP	V/PH		
CT-1 & 2	CH-1 & 2	TOWER TECH	TTXL-121950	510	95	85	78	(2) ⑤ 5 HP EA.	480/3	9600	① 187 TONS 110% CAP
CT-1 & 2	CH-1 & 2	EVAPCO	AT-212-59	510	95	85	78	(2) ⑤ 5 HP EA.	480/3	10,200	② 187 TONS 110% CAP

- NOTES:
- ① PROVIDE WITH 6" TALL LEGS, VIBRATION SWITCHES AND FACTORY CONTROL PANEL.
- ② PROVIDE WITH INVERTER DUTY MOTOR, LADDER & EXTENSION, REINFORCED BASIN FOR ALT. STEEL SUPPORT, SUMP SWEEPER PIPING, BOTTOM SUMP & DRAIN & VIBRATION SWITCH.

TOWER FILTER SCHEDULE								
MARK	AREA SERVED	MANUFACTURER	MODEL	TYPE	GPM	MOTOR		REMARKS
						HP	V/PH	
TF-1 & 2	CT-1 AND CT-2	LAKOS	TBI-0065-CMBV	CENTRIFUGAL SEPARATOR	65	1-1/2	460/3	①②③

- NOTES:
- ① PROVIDE WITH NON OVERLOADING TEFC MOTOR.
- ② PROVIDE WITH AUTOMATIC PURGE VALVE.
- ③ PROVIDE WITH CONTROL PANEL, INCLUDING STARTER W/ OVERLOAD, HOA SELECTOR SWITCH AND NEMA-4X ENCLOSURE.

MECHANICAL LEGEND		
SYMBOL	ABBR	DESCRIPTION
	CHWS	CHILLED WATER SUPPLY
	CHWR	CHILLED WATER RETURN
	CWS	CONDENSER WATER SUPPLY
	CWR	CONDENSER WATER RETURN
	CD	CONDENSATE DRAIN
	D	DRAIN
		BALL VALVE
	CHK	CHECK VALVE
		BUTTERFLY VALVE
	GV	GATE VALVE
		STRAINER WITH VALVE AND THREADED HOSE CONNECTION
		UNION
		FLEXIBLE PIPE CONNECTION
		THERMOMETER
		PRESSURE GAUGE
	F.S.	FLOW SWITCH
	DN	RISER DOWN
	UP	RISER UP
	POC	POINT OF CONNECTION

ABBREVIATIONS			
A	AMPS	LWB	LEAVING WET BULB TEMPERATURE
AFF	ABOVE FINISHED FLOOR	MAX	MAXIMUM
Ⓐ	AT	MBH	THOUSAND BTU PER HOUR
AD	ACCESS DOOR	MCA	MINIMUM CIRCUIT AMPS
AP	ACCESS PANEL	MCC	MOTOR CONTROL CENTER
AV	AUTOMATIC AIR VENT	MECH	MECHANICAL
BDD	BACKDRAFT DAMPER	MFCB	MAXIMUM FUSE OR CIRCUIT BREAKER
BHP	BRAKE HORSEPOWER	MIN	MINIMUM
BTUH	BRITISH THERMAL UNITS PER HOUR	MV	MANUAL AIR VENT
CAP	CAPACITY	NC	NORMALLY CLOSED
CFM	CUBIC FEET PER MINUTE	NIC	NOT IN CONTRACT
CLG	CEILING	NO	NORMALLY OPEN
DB	DRY BULB TEMPERATURE	NO OR #	NUMBER
DIA	DIAMETER	NPSHR	NET POSITIVE SUCTION HEAD REQ'D
DIFF	DIFFERENCE	NTS	NOT TO SCALE
DN	DOWN	OBD	OPPOSED BLADE DAMPER
DWG	DRAWING(S)	OSA	OUTSIDE AIR
EXH	EXHAUST	OV	OUTLET VELOCITY
EAT	ENTERING AIR TEMPERATURE	PD	PRESSURE DROP
EDB	ENTERING DRY BULB TEMPERATURE	PHG	PHASE
EFF	EFFICIENCY	PSI	POUNDS PER SQUARE INCH
ELEV	ELEVATION	PSIG	POUNDS PER SQUARE INCH GAUGE
ESP	EXTERNAL STATIC PRESSURE	RA	RETURN AIR
EWB	ENTERING WET BULB TEMPERATURE	REQ'D	REQUIRED
EXT	EXTERNAL	RH	RELATIVE HUMIDITY
°F	DEGREES FAHRENHEIT	RM	ROOM
FD	FIRE DAMPER	RPM	REVOLUTIONS PER MINUTE
FF	FINISH FLOOR	SA	SUPPLY AIR
FLA	FULL LOAD AMPS	SCFM	CFM, STANDARD CONDITIONS
FLEX	FLEXIBLE	SD	SMOKE DETECTOR
FPM	FEET PER MINUTE	SFD	SMOKE AND FIRE DAMPER
FPS	FEET PER SECOND	SP	STATIC PRESSURE
FS	FLOW SWITCH	TEMP	TEMPERATURE
FT	FOOT OR FEET	UNO	UNLESS NOTED OTHERWISE
GA	GAGE OR GAUGE	VD	VOLUME DAMPER
GAL	GALLON(S)	VEL	VELOCITY
HT	HEIGHT	V	VOLT
HP	HORSEPOWER	W	WATTS
HZ	HERTZ	W/	WITH
IN	INCH OR INCHES	W/O	WITHOUT
KW	KILOWATT	WG	WATER GAUGE
LBS	POUNDS	WT	WEIGHT
LDB	LEAVING DRY BULB TEMPERATURE	ø	ROUND, DIAMETER

REV.	DATE	DESCRIPTION	BY




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LEGEND AND SCHEDULES

KYRENE del MILENIO
ELEMENTARY SCHOOL

4630 E. FRYE ROAD
PHOENIX, ARIZONA 85048



Professional Engineer
RUSSELL A. BETZ
31249
03/31/15

DR. BY
LRW

DES. BY
LAM

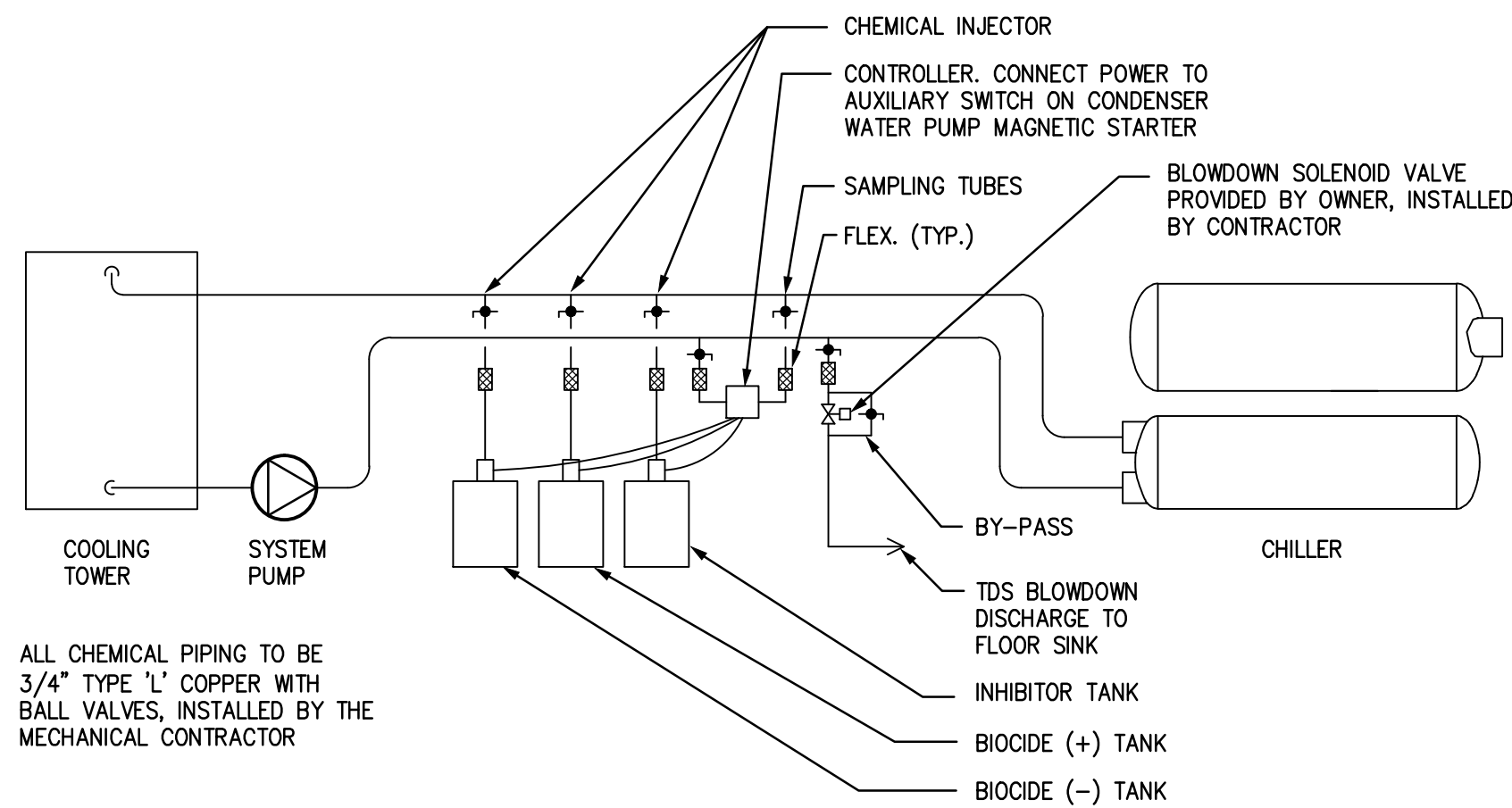
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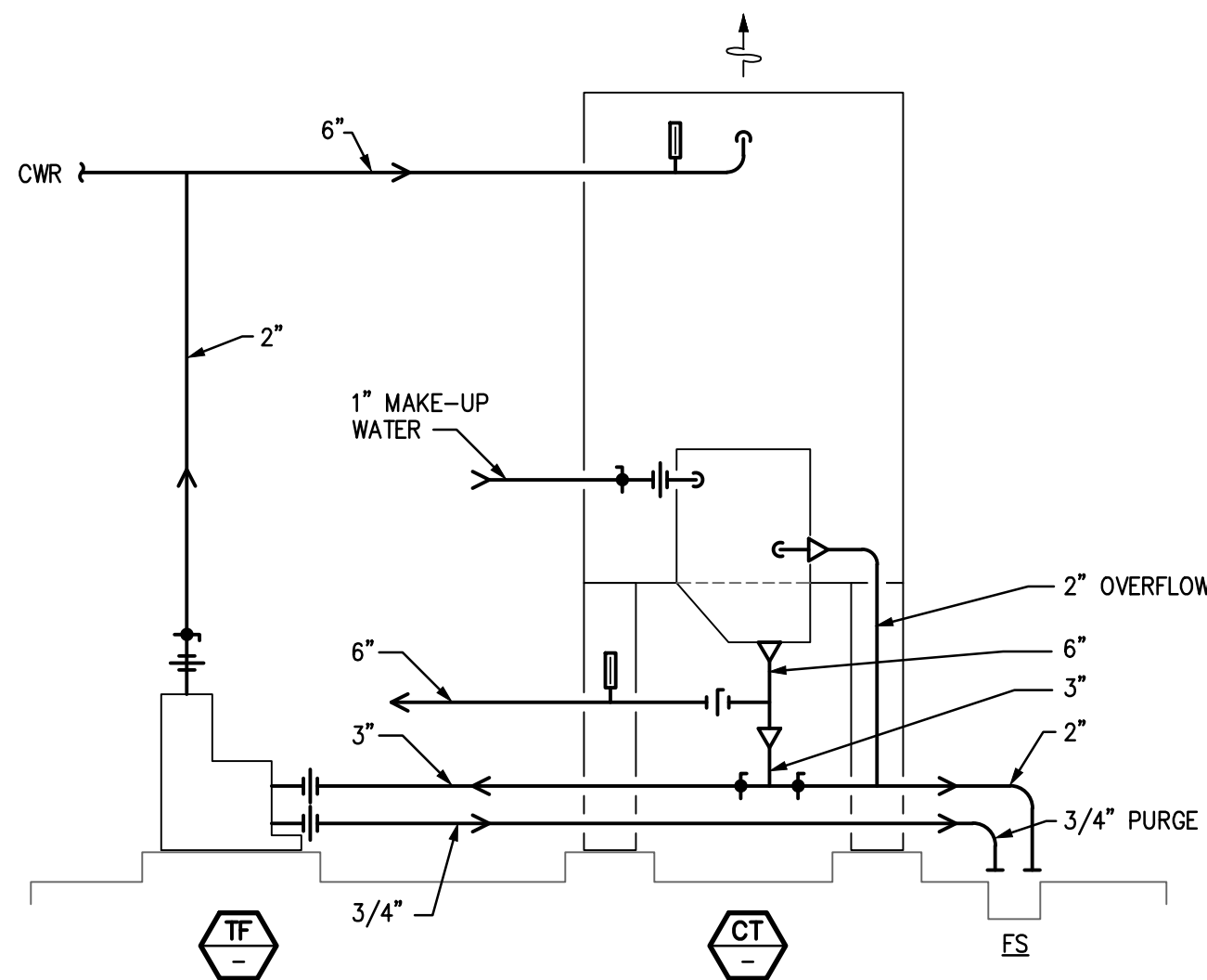
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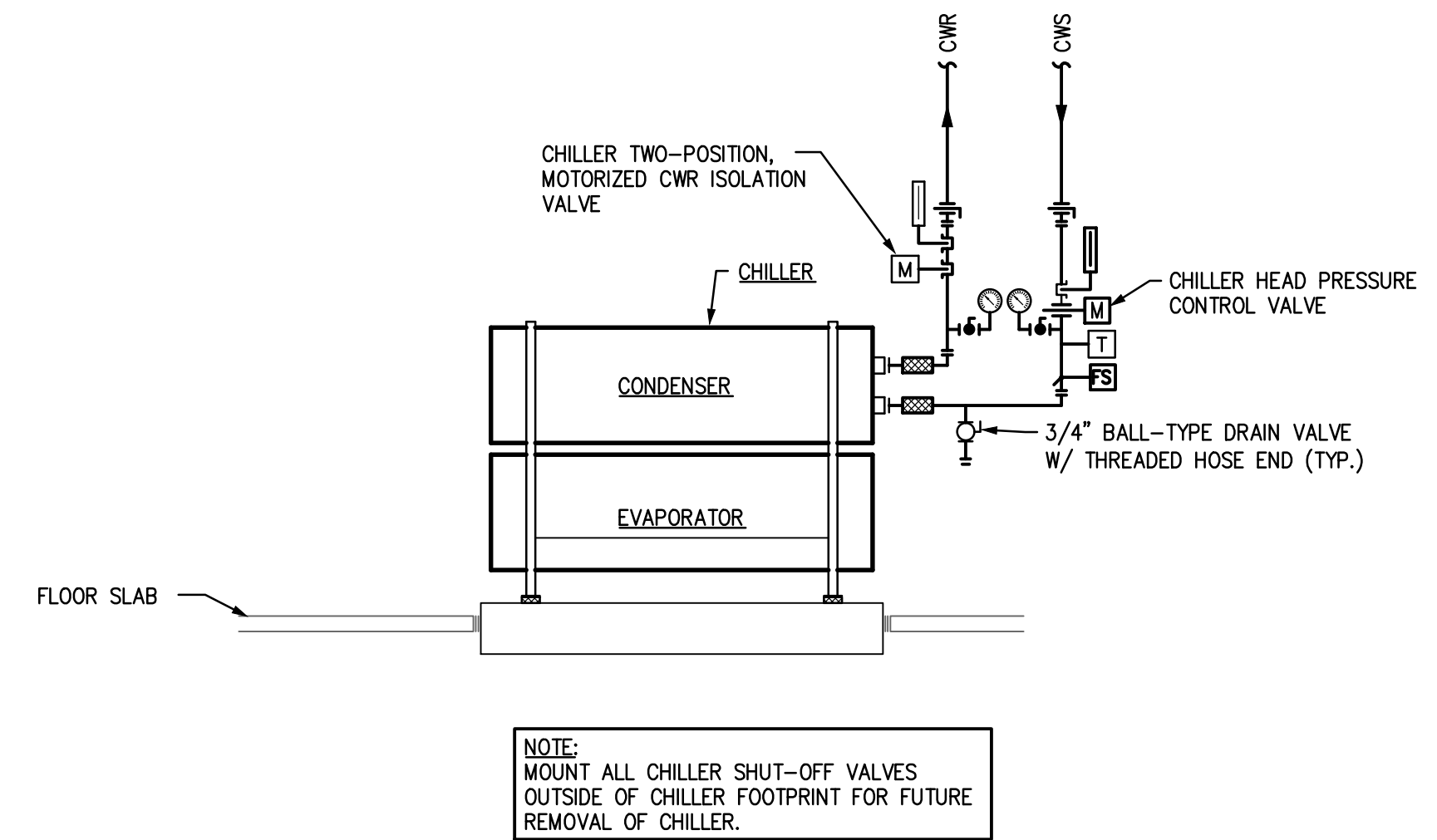
TOWER WATER TREATMENT DETAIL

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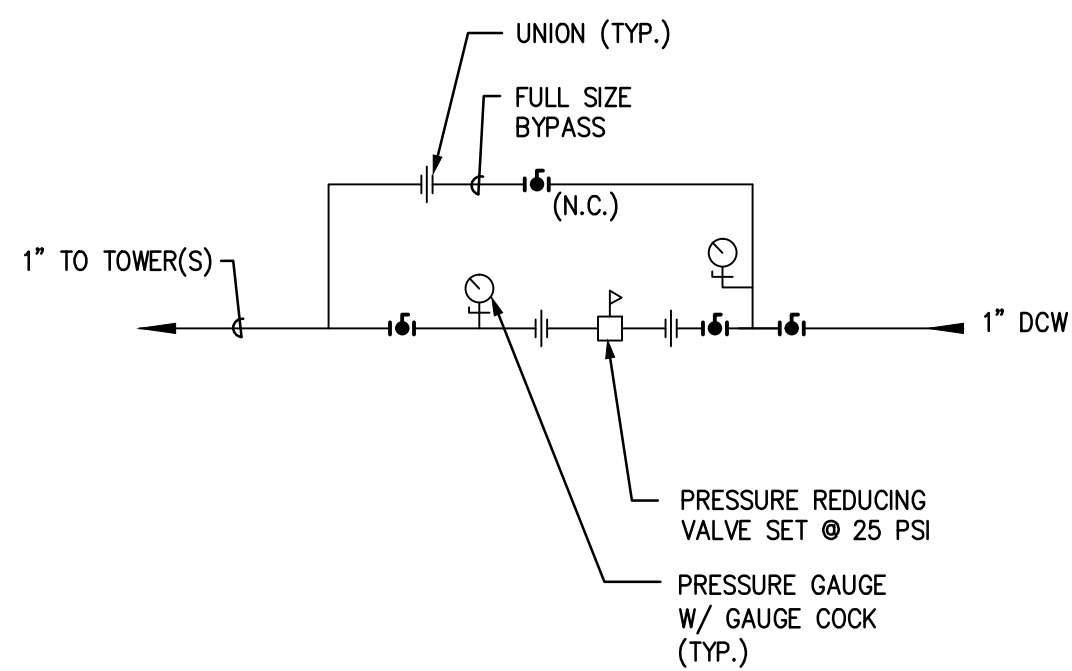
COOLING TOWER DIAGRAM

NTS MAKE-UP WATER, TOWER DRAIN AND ALL FILTER PIPING SHALL BE COPPER.



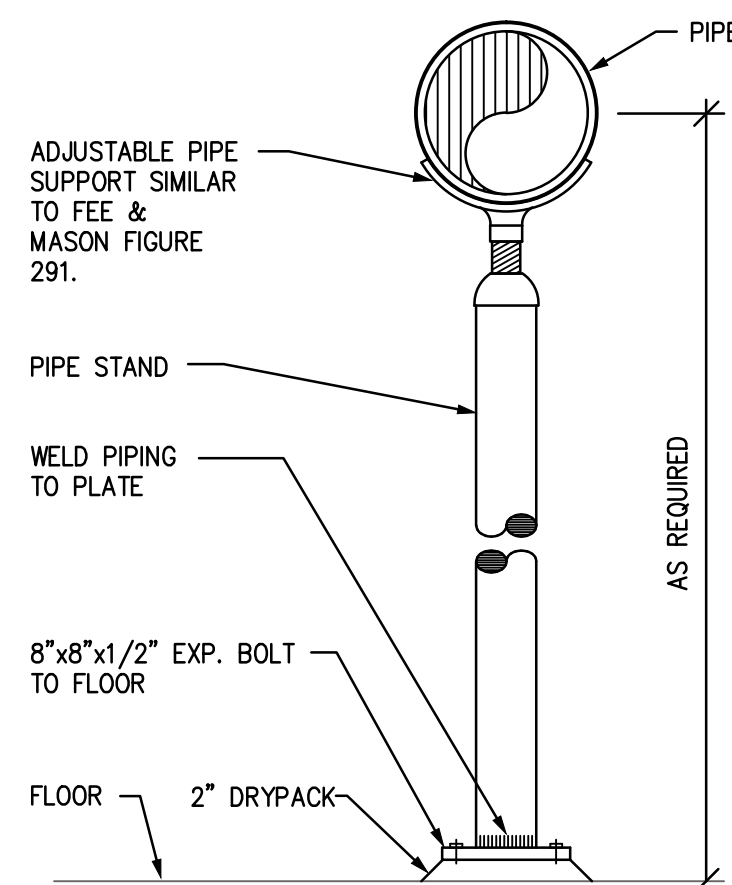
WATER COOLED CHILLER DIAGRAM

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TOWER WATER MAKE-UP PIPING DIAGRAM

NTS



PIPE STAND DETAIL

NTS

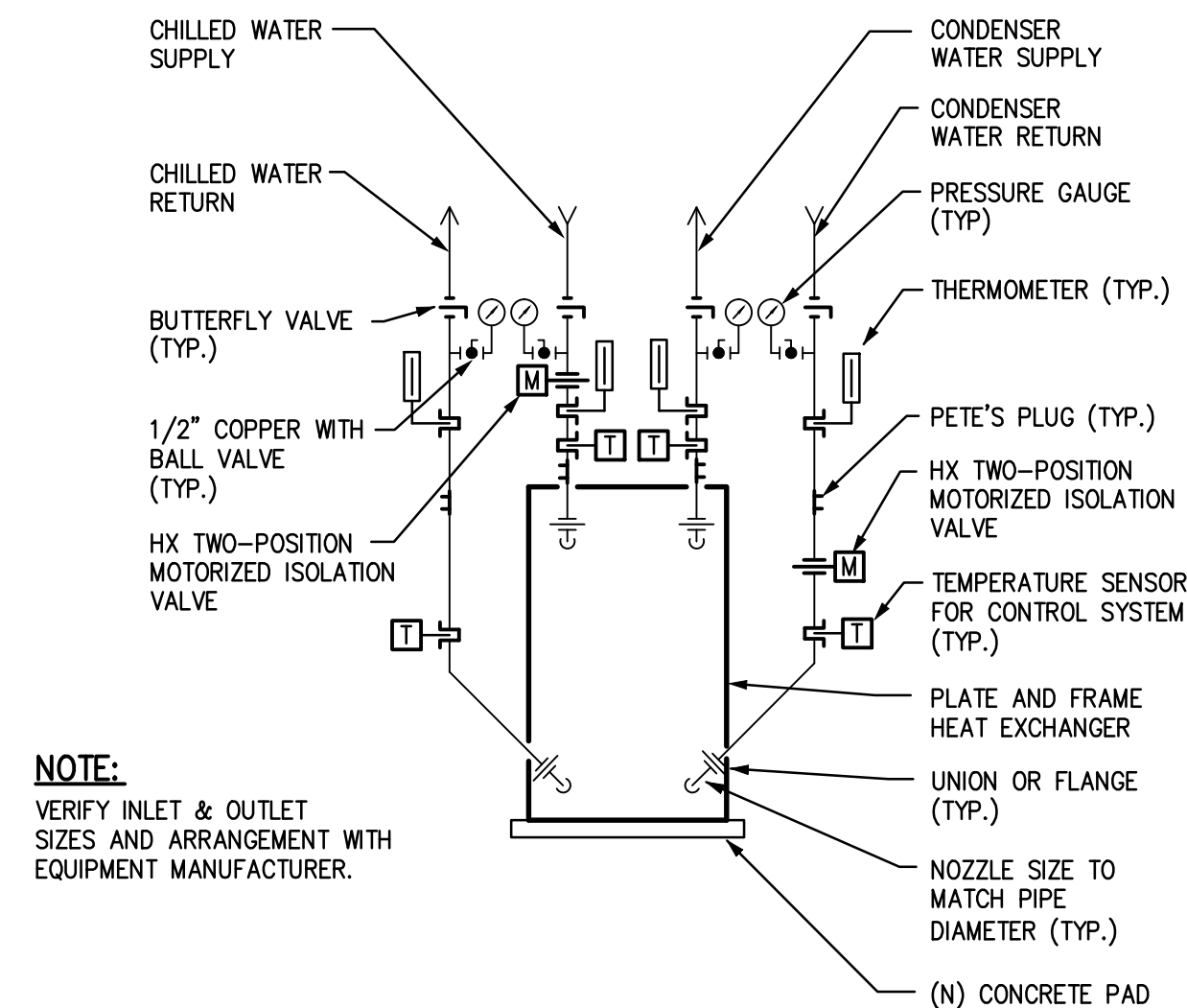
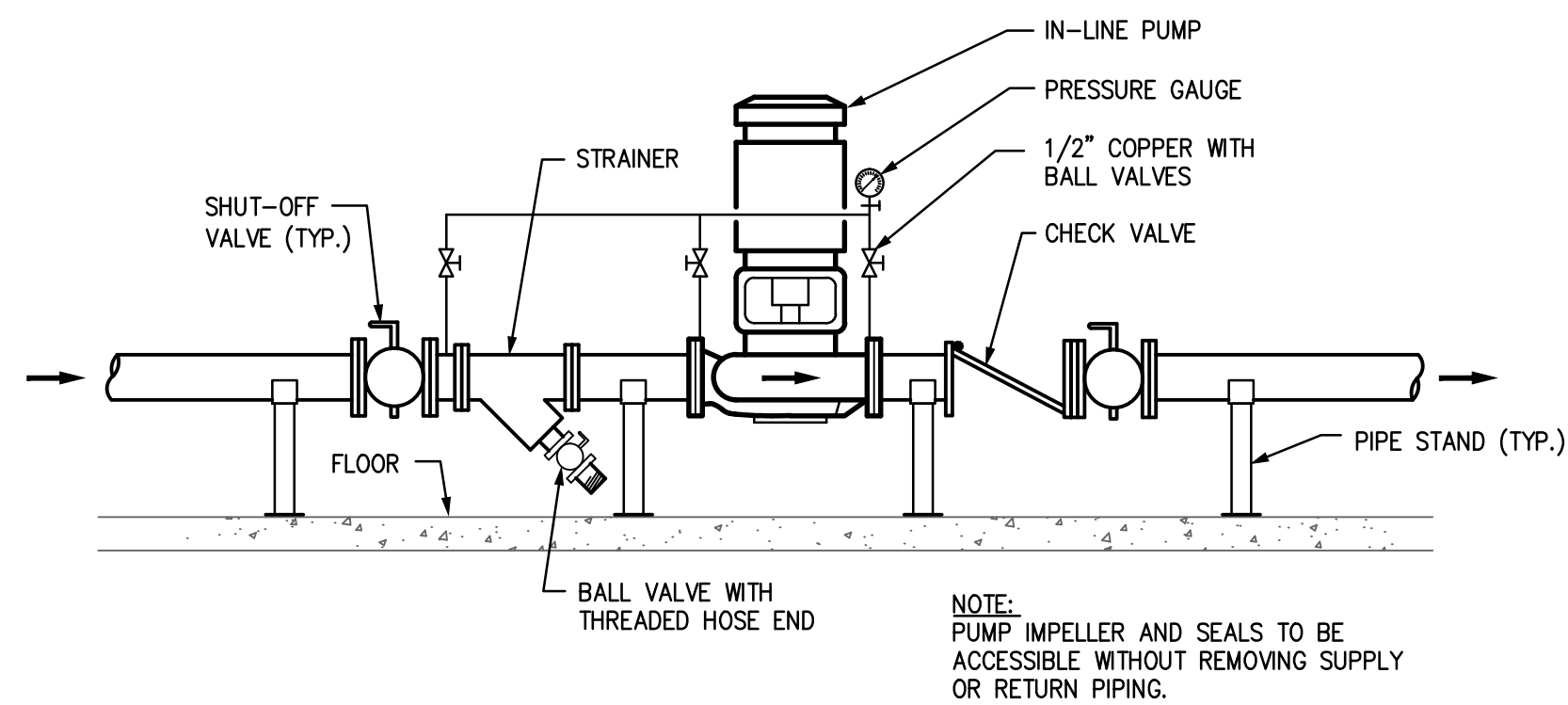


PLATE AND FRAME HEAT EXCHANGER PIPING DETAIL

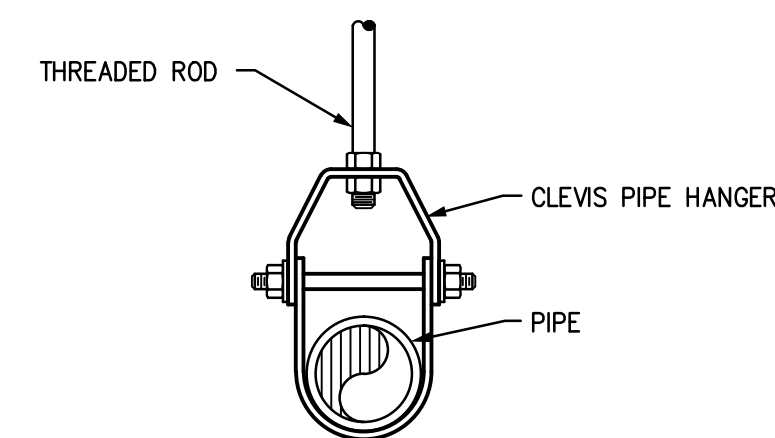
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IN-LINE PUMP DETAIL

NTS

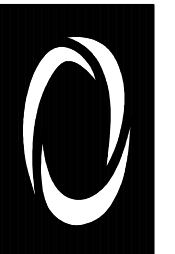
- GENERAL NOTES:**
1. PROVIDE 3/4" WELD-O-LETS FOR CONDENSER AND CHILLED WATER CHEMICAL TREATMENT PIPING.
 2. PROVIDE 3/4" WELD-O-LETS FOR CONDENSER, CHILLED WATER AND THE CONTROL SYSTEM SENSORS. VERIFY QUANTITY AND LOCATIONS. SEE #3 BELOW.
 3. ALL WELD-O-LETS, THERMOMETER, PETE'S PLUGS, CONTROLS, GAUGES, ETC., SHALL BE LOCATED 'BELOW' THE EQUIPMENT'S ISOLATION BUTTERFLY VALVE.



NON-INSULATED PIPE SUPPORT DETAIL

NTS

LSW Engineers
ARIZONA INCORPORATED



2333 West Northern Avenue
Phoenix, Arizona 85021
Telephone: 602.249.1320
Facsimile: 602.336.3276
E-Mail: lswphx@lswphx.com

DETAILS AND DIAGRAMS

KYRENE del MILENIO
ELEMENTARY SCHOOL

4630 E. FRYE ROAD
PHOENIX, ARIZONA 85048



DR. BY LRW	DES. BY LAM	CHK. BY LAM/RAB
DATE 02/17/12	JOB NO. 2011-097.000	

SHEET NO.

M-4
OF

CONSULTING ENGINEERS
77 EAST THOMAS ROAD, SUITE 120
PHOENIX, ARIZONA 85012
(602) 285-1720 • (602) 285-1530 (FAX)

BY: RD

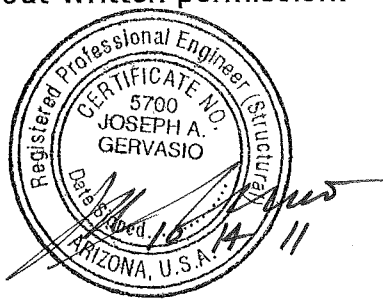
PARTIAL CALCULATIONS

PROJECT: KYRENE DEL MILenio-MECH. EQUIP
4630 E. FRYE ROAD
PHOENIX, AZ 85048
SUPPORTS

CLIENT: LSW ENGINEERS

[illegible]

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EXPIRES 12/31/11

10/08 - 7F

GERVASIO & ASSOC., INC.

CONSULTING ENGINEERS

(602) 285-1720 • 77 East Thomas Road, Suite 120

Phoenix, Arizona 85012

Date 8/11 Job No. 1151

By RD Sheet No. D-1

GENERAL - DESIGN CRITERIA

CODE

2006 INTERNATIONAL BUILDING CODE

DESIGN CRITERIA

DEAD LOADS: ROOF: NA PSF
FLOOR: NA PSF
LIVE LOADS: ROOF: NA PSF
FLOOR: NA PSF
LATERAL LOADS: WIND: 90 MPH (3 SECOND GUST WIND SPEED),
EXPOSURE C

SEISMIC: DESIGN CATEGORY B

$S_{DS} = 0.235$ $I_e = 1.25$

ALLOWABLE STRESSES

CONCRETE: REGULAR WT. CONC. $f_c = 3,000$ PSI

STRUCTURAL DESIGN BASED ON $f_c = 2,500$ PSI
NO SPECIAL STRUCTURAL INSPECTION REQ'D.

REINF. STEEL: ASTM A-615, GRADE 60, $F_y = 60$ KSI

STRUCT. STEEL: ROLLED SECTIONS: ASTM A-992, GRADE 50, $F_y = 50$ KSI
PLATES, ANGLES AND CHANNELS: ASTM A-36, $F_y = 36$ KSI
BOLTS: ASTM A-307
~~PIPES: ASTM A-53, GRADE B, $F_y = 35$ KSI~~
~~TUBES: ASTM A-500, GRADE B, $F_y = 46$ KSI~~
WELDING: E-70 SERIES ELECTRODES

SOIL: Q MAX = 1000 PSF @ 1'-6" MIN. BELOW GRADE
PER CITY OF PHX AMENDMENTS
SOIL REPORT BY NONE

DATED _____ JOB # _____

GERVASIO & ASSOC. INC.
CONSULTING ENGINEERS

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PHOENIX, ARIZONA 85012-3115

Date 8/11
By RD

Job No. 1151
Sheet No. F-1

DETERMINE SEISMIC DESIGN CATEGORY

o SITE CLASS D PER IBC SECTION 1613.5.2

o ZIP CODE: 85048

OCCUPANCY CATEGORY III

$I = 1.25$

SOIL SITE CLASS D

$S_{DS} = 0.235$

ASCE 7-05

$$0.3 S_{DS} I_p W_p < F_p \leq F_p = 1.6 S_{DS} I_p W_p \quad (\text{EQ. 13.3-2})$$

$$F_p = 1.6 (0.235) (1.25) W_p$$

$$F_p = 0.47 W_p$$

WIND LOAD ASCE 7-05 SECTION 6.5.15

$$F = q_z G C_F A_F$$

90 MPH, EXP. C

$G = 0.85$

$$h/D = 11' 8" / 7' 5.875" = 1.56 \rightarrow C_F = 1.31 \quad \text{FIG 6-21}$$

$$q_z = 0.00256 K_z K_{z6} K_d V^2 I$$

$K_z =$ (TABLE 6-3) VARIES

$K_{z6} = 1.0$ (FIG 6-4)

$K_d = 0.85$

$I = 1.15$ OCCUPANCY CATEGORY III

$$q_z = 0.00256 (K_z) (1.0) (0.85) (90)^2 (1.15) = 20.3 K_z$$

$$F = 20.3 K_z (0.85) (1.31) A_F = 22.6 K_z A_F$$

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Date 8/11
By RD

Job No. 1151
Sheet No. F2

COOLING TOWER @ MANITAS & MILANTO
DETERMINE LATERAL LOADS

SEISMIC:

ZIP CODE: 85284 MANITAS
85018 MILANTO
SDS = 0.235

$$0.3 S_D S_I I_p W_p < F_p \leq F_p = 1.6 S_D S_I I_p W_p \text{ (EQ. 13.3-2)}$$

$$= 1.6 (0.235) (1.25) W_p$$

$$= 0.47 W_p$$

WIND:

90 MPH, EXPC

$$F = q_z G C_F A_F$$

$$G = 0.85 \text{ LEES}$$

$$\text{UNIT HT.} = 11' - 1/4" + 6' = 17' - 1/4" \text{ USE } 17' - 0"$$

$$\text{UNIT SIZE} = 7' \times 13' - 53/4" \text{ USE } 7' \times 14'$$

$$h/D = 17/7 = 2.4$$

$$\begin{matrix} 1 & 1.3 \\ 2.4 & C_F \\ 7 & 1.4 \end{matrix} \quad C_F = 1.32$$

$$q_z = 0.00256 K_z (1.0) (0.85) (90)^2 (1.15) = 20.3 K_z$$

$$K_z = 0.87$$

$$F = 20.3 (0.87) (0.85) (1.32)^{C_F} A_F = 19.8 A_F$$

$$\text{OPERATING UNIT WT } 9609 \# \times 1.20 = 11,531 \#$$

PER FBC 1607.8.2

$$F_{\text{SEISMIC}} = 0.47 (11,531 \#) = 5420 \# \leftarrow \text{CONTROLS}$$

$$F_{\text{WIND}} = 19.8 \text{ PSF} (7' \times 14') = 1940 \#$$

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Date 8/11
By RD

Job No. 1151
Sheet No. F3

COOLING TOWER @ MANITAS MILANO
LATERAL LOADS

$$F_{seismic} = 5420 \#$$

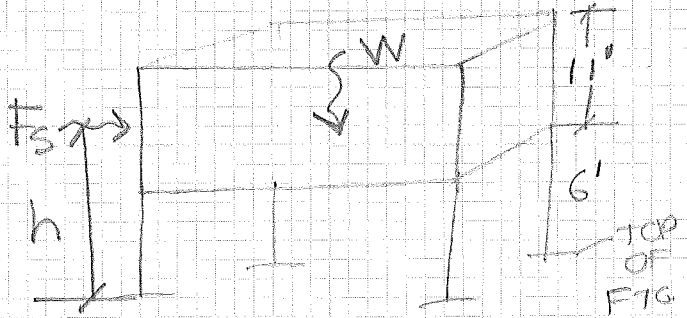
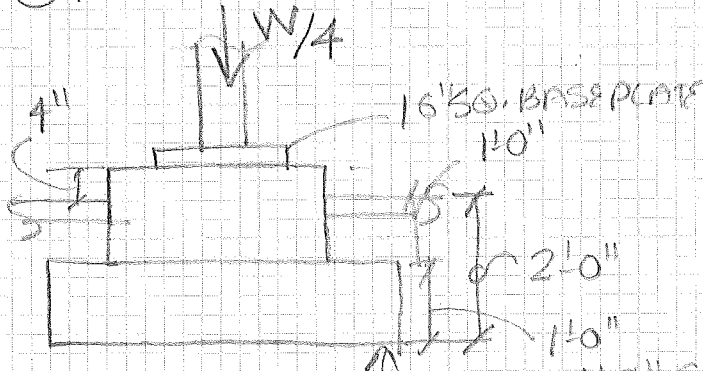
FOR FOUNDATION DESIGN PER IBC 1605.3.2

$$E_v = 0 \text{ so } E = E_h = F_{seismic}$$

FOOTING DESIGN

$$F_{seismic} = \frac{5420 \#}{4} = 1355 \#$$

$$OTM = 1355 \# (6') = 8130 \#$$



$$h = 11' + 6' = 11.5'$$

$$W = \frac{9609 \#}{4} = 2402 \#$$

- CONC. PIER $150' \times 2' \times 2' \times 1.33' = 798 \#$
- CONC. FTG $150' \times 4' \times 4' \times 1' = 2400 \#$
- SOFC OUT. $100' \times 2' \times 2' \times 1' = 400 \#$

$$\Sigma W = 3598 \# + 2402 = 6000 \#$$

$$RM = 6.0K (2') = 12'K$$

$$FS = 12 / 8.13 = 1.5 \approx 1.5 OK.$$

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Date 8/11
By RD

Job No. 1151
Sheet No. F4

COOKING TOWER @ MANTITAS & MILANO

CHECK SOIL PRESSURE

$$X = \frac{12 - 8.13}{6.0} = 0.65' < L/3 = 1.33' \text{ O.K. OUTSIDE MIDDLE 1/3 OF FTG.}$$

$$P = \frac{2(6.0K)}{3(0.65')(4')} = 1538 \text{ PSF} < 2000 \text{ PSF O.K.}$$

PER EXIST. DRUGS. SHT. SI. / FOR MANTITAS

> 1000 PSF MILANO PER PHX CODE AMENDMENTS

TRY 4'-6" SQ. FOOTING

$$\text{CONC. PIER WT.} = 798 \#$$

$$\text{CONC. FTG. WT.} = 3038 \#$$

$$\text{SOIL WT.} = 625 \#$$

$$\Sigma W = 4161 \# + 2102 \# = 6863 \#$$

$$R_m = 6.863(4.5'/2) = 15.4' \text{ O.K.}$$

$$F.S. = 1.9 > 1.5 \text{ O.K.}$$

CHECK SOIL PRESSURE

$$X = \frac{15.4 - 8.13}{6.863} = 1.06' < L/3 = 1.5'$$

$$P = \frac{2(6.863)}{3(1.06')(4.5')} = 959 \text{ PSF} < 1000 \text{ PSF O.K.}$$

USE 4'-6" SQ. X 12" THK.
FTG. W/ #5 @ 12" OC
E.W.

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Date 8/11
By RD

Job No. 1151
Sheet No. FS

MANHATTAN ENGINEERING

CHECK ANCHORAGE @ FOOTING

$$F_s = \frac{5420\#}{2 \text{ STEPS}} = 2710\#$$

$$T = C = \frac{2710(11.5')}{7'} = 4452\#$$

SHEAR LOAD @ BOLTS

$$F_s = \frac{5420\#}{4 \text{ FTS.}} = \frac{1355\#}{2 \text{ BOLTS}} = 678\#/\text{BOLT}$$

TENSION LOAD @ BOLTS

$$T = \frac{4452\#}{2 \text{ BOLTS}} = 2226\#/\text{BOLT}$$

PER IBC TABLE 1911.2 WSD

1" Ø BOLT $f_{cm} = 2500 \text{ PSI}$
EDGE DISTANCE = 6"
MIN. EMBED. = 7"

$V_{allow} = 4125\#$ SPACING = 12"

$T_{allow} = 3050\#$

$$\frac{S}{6} \quad 3050/2 = 1525$$

$$10\frac{1}{2} \quad T \quad T = 2669\#$$

$$12 \quad 3050$$

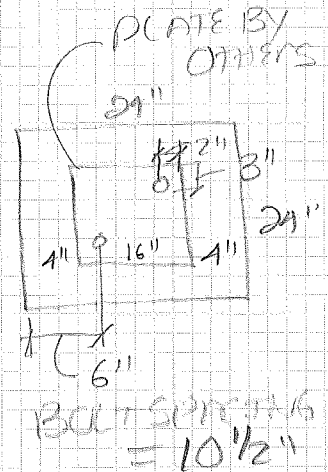
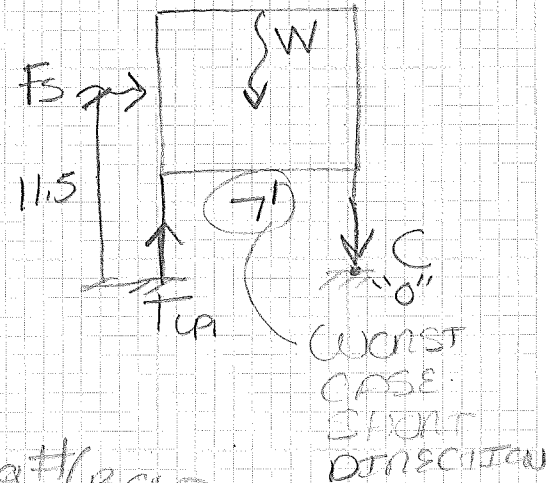
$$4125/2 = 2063\#$$

$$V_{allow} = 3610\#$$

$$4125$$

$$\left(\frac{678}{3610}\right)^{5/3} + \left(\frac{2226}{2669}\right)^{5/3} = 0.80 < 1.0 \quad \text{OK}$$

USE 1" Ø MIN. BOLT
w/ 7" MIN. EMBED.



(APPLY UNLESS NOTED OTHERWISE ON DRAWINGS)

1. 2006 International Building Code with City of Phoenix Amendments.

1. Dead Loads:
 - a. Mechanical Equipment & Piping; See plans
2. Lateral Loads:
 - a. Wind: 90 MPH, 3 second gust. Exposure C, I=1.15
 - b. Seismic: Sps = 0.235, Seismic Design Category B, I = 1.25

1. Bear footings on firm, compacted soil at 2'-0" minimum below existing slab
2. Allowable soil bearing pressure = 1000 psf, per IBC Table 1804.2.
3. Foundations are designed for dry conditions and must remain dry during construction.

1. Minimum 3000 psi compressive strength at 28 days with Type II cement per ASTM C150; aggregate per ASTM C33, 1" minimum rock for footings and 3/4" minimum rock for other concrete. Replace cement with fly-ash at a rate of 15% to 20% by weight of the total cementitious materials. Fly-ash shall conform to ASTM C618, Type F. Structural design based on 2500 psi, no special inspection required.
2. Maximum slump 4 1/2".
3. ACI codes, recommendations and practices apply.
4. Mechanically vibrate all concrete.
5. Non-shrink grout shall be non-metallic with a minimum compressive strength of 4000 psi in 3 days, mixed and installed in accordance with the manufacturer's recommendations.
6. Non-shrink grout shall be installed under column base plates before loading members.

1. ASTM A615, Grade 60, deformed bars, except #2 bars. CRSI and ACI manuals apply.
2. Clear concrete coverages per details.
3. Lap splices in concrete 36 bar diameters.
4. Place reinforcing per ACI 318-05 and CRSI Standards.

1. AISC and AWS codes and handbooks apply.
2. Plates: ASTM A36, $F_y = 36$ ksi minimum.
3. Bolts: ASTM A307.
4. Anchor bolts: ASTM F1554-99, $F_y = 36$ ksi minimum.
5. Steel surfaces to be welded shall be thoroughly cleaned of all foreign matter including paint for at least 2 inches from the root of the weld.
6. Minimum embedment of bolts and anchors in masonry, grout or concrete shall be 5" with a 3" hook or headed stud unless noted otherwise on details.

1. Verify all dimensions and conditions prior to starting work. Notify the Mechanical Engineer of any discrepancies or inconsistencies.
2. Verify in field all existing conditions shown on drawings.
3. Establish and verify all openings and inserts for mechanical, electrical and plumbing with appropriate trades, drawings.
4. Provide all necessary temporary bracing, shoring, guying, or other means to avoid excessive stresses and to hold structural elements in place during construction.
5. Options are for the contractor's convenience. He shall be responsible for all changes necessary if he chooses an option and shall coordinate all details. The cost of additional design work necessitated by selection of an option shall be borne by the contractor. Options shall not delay construction schedule.
6. The cost of additional design work due to errors or omissions in construction shall be borne by the contractor.
7. Any engineering design provided by others and submitted for review shall bear the seal and signature of an Engineer registered in Arizona. If this engineering design requires special structural inspection, they shall be responsible for the inspection.
8. Details on the Structural Drawings are typical. Verify all dimensions with the Mechanical Drawings.

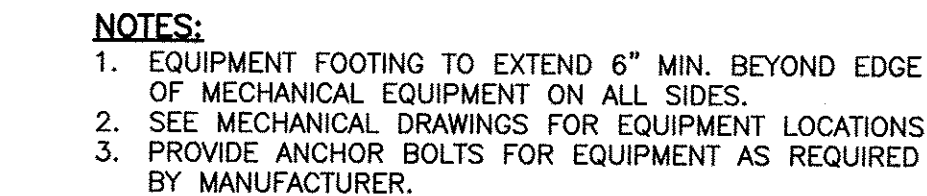
Special Inspection is required for all remodel work. Call Structural Engineer for inspection, phone number (602) 285-1720. Provide 48 hours notice.

Special inspection is to be provided in addition to the inspections conducted by the Department of Building Safety and shall not be construed to relieve the Owner or his authorized agent from requesting the periodic and called inspections required by Section 109 of the International Building Code. The special inspector shall be approved by the City Building Official prior to starting work.

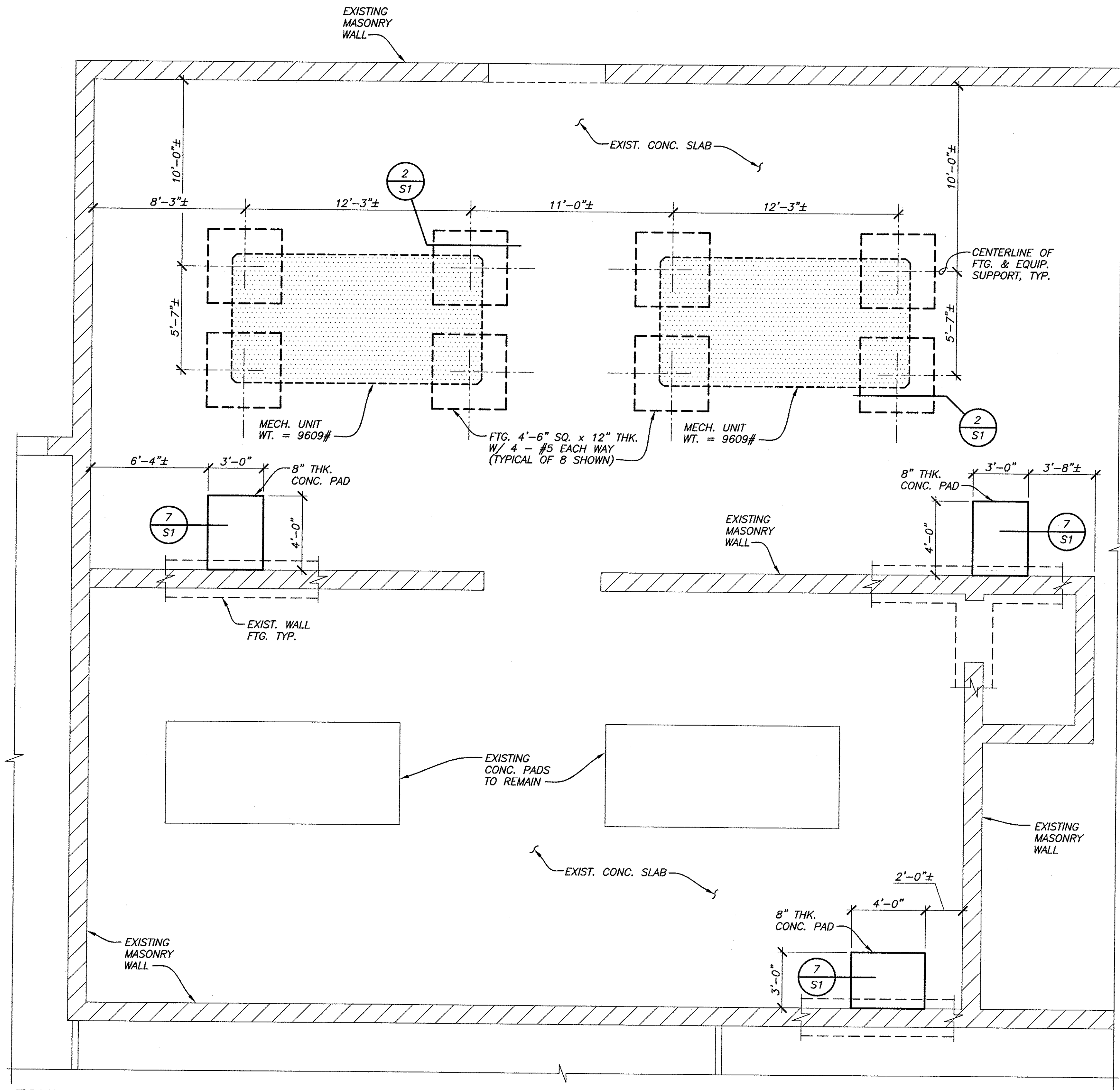
SPECIAL INSPECTION IS REQUIRED FOR THE FOLLOWING WORK:
(PER IBC SECTION 1704)

NON-SHRINK GROUT:

During placement of non-shrink grout. This inspection may be done on a periodic basis.



7 MECH. EQUIPMENT SUPPORT FOOTING 1"=1'-0"



FOUNDATION NOTES:

1. SEE STRUCTURAL NOTES ON SHEET S-1.
2. AT COOLING TOWERS REMOVE EXISTING STEEL BEAMS, CONCRETE PIERS AND FOOTINGS AS REQUIRED FOR NEW FOOTINGS AND COOLING TOWER SUPPORTS.
3. SAWCUT EXISTING CONCRETE SLAB AS REQUIRED FOR NEW FOOTINGS AND PADS. FOOTINGS SHALL BEAR ON FIRM, COMPACTED SOIL.

PARTIAL FOUNDATION PLAN



CONSULTING ENGINEERS
77 EAST THOMAS ROAD, SUITE 120
PHOENIX, ARIZONA 85012
(602) 285-1720

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SHEET NO.

S-1
OF

1 OF 1

DR. BY
HLC

DES. BY
RDCKD. B
RD

DATE _____

JOB NO

09/14/11

2011-097,000

SHEET NO.

S

1 OF 1

#1151-MILENIO

PARTIAL FOUNDATION PLAN

**KYRENE del MILENIO
ELEMENTARY SCHOOL**

4630 E. FRYE ROAD
PHOENIX, ARIZONA 85048

PHOENIX, ARIZONA 85048

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ARIZONA INCORPORATED

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